

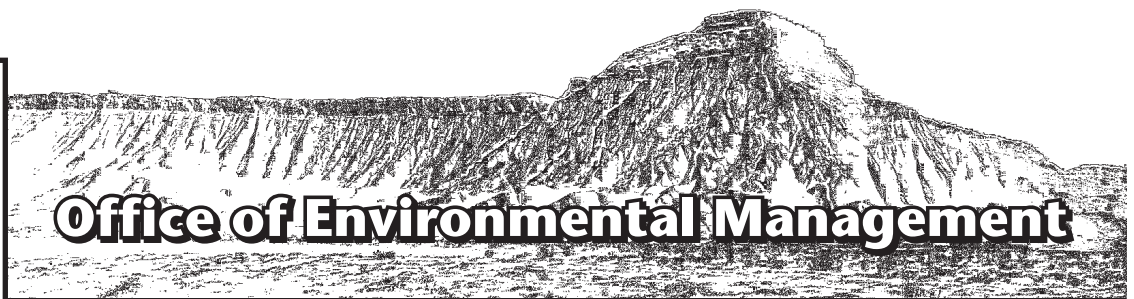
# Environmental Air Monitoring Data Quarterly Report for the Moab, Utah, Site

Third Quarter 2003  
(July through September)

March 2004



U.S. Department  
of Energy



**Moab, Utah**  
Environmental Air Monitoring Data Results  
July - September, 2003

**Environmental Data Report Contents**

This Environmental Air Monitoring Data Report includes the following information:

<u>Item No.</u>	<u>Description of Contents</u>
1.	<b>Summary of Results</b>
2.	<b>Data Assessment</b> , which includes the following: <ul style="list-style-type: none"><li>a. Field activities verification checklist.</li><li>b. Data Assessment Summary.</li></ul>
3.	<b>Environmental Air Monitoring Data.</b> <ul style="list-style-type: none"><li>a. Radio-particulate Data Table.</li><li>b. Atmospheric Radon-222 and Direct Gamma Radiation Data Table.</li><li>c. Time versus Concentration graphs.</li></ul>
4.	<b>Sample Location Maps.</b>

## Summary of Results

**Site:** Moab, Utah

**Sampling Period:** July - September, 2003

### SUMMARY

**Radio-particulates:** No standards or radiological exposure limits were exceeded at any of the nine radio-particulate monitoring locations. Analytical data for all analytes (Radium-226, Th-230, Polonium-210, and Uranium-total) were below their respective Derived Concentration Guidelines (DCGs), as found in DOE Order 5400.5, *Radiation Protection of the Public and Environment*.

**Radon-222:** DOE Order 5400.5, *Radiation Protection of the Public and Environment*, establishes a guideline for atmospheric emissions of radon-222 gas that is applicable to the Moab Site. This guideline is 3.0 pCi/L above background. Background concentrations of radon-222 in the Moab area have been measured to be approximately 0.6 pCi/L; therefore, the guideline for radon-222 emissions at the Moab Site is 3.6 pCi/L. Monitoring data collected from the third quarter of 2003, indicate that this guideline was exceeded at six on-site monitoring locations (Table 1). None of the off-site monitoring locations, including the Maximally Exposed Individual (MEI) location, exceeded the radon-222 guideline.

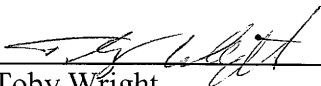
**Direct Environmental Gamma Radiation:** DOE Order 5400.5, *Radiation Protection of the Public and Environment*, establishes a dose limit of 100 mrem/yr above naturally occurring radiation levels (background). Background gamma radiation for the Moab area has been measured at approximately 81 mrem/yr; therefore, the gamma dose limit for the Moab Site is 181 mrem/yr. Although radiation doses are summed at the end of a calendar year to determine the actual dose, the annual dose may be estimated from the quarterly monitoring results. Based on the monitoring data collected from the third quarter of 2003, elevated gamma measurements were observed at eleven on-site monitoring locations. None of the off-site monitoring locations, including the MEI location, exceeded DOE's gamma radiation dose limit.

It should be noted that, although the exposure rates may be exceeded at several locations along the DOE site property boundary, this does not reflect expected doses to the public. These data represent the dose that a member of the public could receive *if* that person resided at the point where the data was collected for an entire year. This is not a realistic representation of actual or expected public exposure conditions because no member of the public permanently resides (on an annual basis) at or near these elevated locations. Monitoring data observed at the MEI location represents the only true residential exposure. These data are less than the DOE annual public dose limit (100 mrem/yr), therefore, the dose limit to the public is not being exceeded, even at adjacent lands where the public has access on a transient or short term basis.

*Table 1. Moab Environmental Air Monitoring Locations with Samples that Exceeded Applicable Regulatory Standards, Limits, or Guidelines in Third Quarter, 2003*

ANALYTE	STANDARD / GUIDELINE	SAMPLING LOCATIONS EXCEEDING STANDARDS / GUIDELINES
Radon-222	3.6 pCi/L	MPS-0106, MPS-0107, MPS-0108, MPS-0114 <sup>1</sup> , MPS-0115 <sup>1</sup> , MPS-0116 <sup>1</sup>
Direct Gamma Radiation	181 mrem/yr	MPS-0101, MPS-0105, MPS-0107, MPS-0108, MPS-0109, MPS-0110, MPS-0111, MPS-0113, MPS-0114 <sup>1</sup> , MPS-0115 <sup>1</sup> , MPS-0116 <sup>1</sup>

<sup>1</sup> Although these locations exceeded standards/guidelines for the reporting period, these monitoring locations are located on top of the tailings pile, and do not represent a realistic exposure scenario to members of the general public. Because these locations do not provide any meaningful exposure data to members of the public, they have been eliminated from the monitoring network, and will not be sampled or reported in future monitoring events.

  
 Toby Wright  
 Moab Site Manager

3/25/04  
 Date

# **DATA ASSESSMENT**

# Environmental Air Monitoring Field Activities Verification Checklist

Project Moab Site  
Date(s) of Verification 03/11/04

Date(s) of Air Monitoring 10/01/03  
Name of Verifier Michael J. GARDNER

Response Comments  
(Yes, No, N/A)

1. Is the SAP the primary document directing field procedures?
2. Were the sampling locations specified in the SAP?
3. Were all low-volume air samplers operating at 60 liters/minute?  
Did any of the samplers require air flow adjustment?
4. Were detectors (radon cups, TLDs) and monitoring equipment found to be in undisturbed and operable condition upon arrival?
5. Were the hourly clocks on the low-volume air samplers operational upon arrival?  
Were the run times recorded for each radio-particulate monitoring location?
6. Were duplicates (for radon and gamma radiation) taken at a frequency of one per 20 samples?
7. Were equipment blanks (for radioparticulates) taken at a frequency of one per 20 samples?
8. Were trip blanks (for radon and gamma radiation) included with each shipment?
9. Was the identity of the QC sample locations protected?  
Were the true locations of the QC samples recorded in the Field Log Book?
10. Were all samples collected as specified in the SAP?
11. Were chain of custody records completed and was sample custody maintained?
12. Are field data sheets signed and dated by sampling personnel?
13. Was all other pertinent information documented on the field data sheets?

Yes

Yes

No.

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

MPS-0123 required air flow adjustment from 50 L/min to 60 L/min.

**MOAB, UTAH  
MOAB SITE  
THIRD QUARTER 2003 SAMPLING  
DATA ASSESSMENT SUMMARY**

**RADIO-PARTICULATE ANALYSES**

Glass fiber (47 mm) air filters were analyzed for radio-particulates (Ra-226, Th-230, Po-210, and U-total) by the DOE-GJO Analytical Laboratory. Analytical results for the third quarter 2003 sampling period are reported in requisition numbers 18555 (July, 2003), 18600 (August, 2003), and 18634 (September, 2003). Radio-isotopes Ra-226, Th-230, and Po-210 were analyzed by alpha spectrometry method RC-4, and total uranium was analyzed using inductively coupled plasma-mass spectrometry, method AS-6. All laboratory control criteria were met for these analyses; therefore, data validation qualifiers were not required.

**ATMOSPHERIC RADON-222 ANALYSES**

Radon cups were analyzed by Landauer, Inc., in accordance with Landauer's *Quality Assurance Manual for Radon Monitoring Services, Revision Number 9, October 17, 2002*. Analytical data were received in a report dated October 9, 2003. Unlike radio-particulate analyses, radon-222 data are not reported with qualifiers, per se. The laboratory will make a special note/comment in the event that the detectors are missing, damaged, or the detectors cannot be read. Once the data report is received, sampling personnel review all data to insure that the results are consistent with other data points, and with previous data collected for each monitoring location. Data are randomly checked (hand-calculated) to verify that the reported concentrations/results are accurate. These quality assurance checks are conducted at an interval of one in every 10 results.

**DIRECT ENVIRONMENTAL GAMMA RADIATION ANALYSES**

Thermoluminescent dosimeters (TLDs), used for continuous dose measurements at the Moab Site, are analyzed by Environmental, Inc., Midwest Laboratory, in accordance with their analytical procedure *Preparation and Readout of Teledyne Isotopes TLD Card, TIML-TLD-01, Revision 6* (Teledyne Isotopes, 1995). All data are reported at the 95% confidence level (2 sigma). Once the data report is received, sampling personnel review all data to insure that the results are consistent with other data points, and with previous data collected for each monitoring location. Data are randomly checked (hand-calculated) to verify that the reported results indeed fall within the acceptable limits of counting error. These quality assurance checks are conducted at an interval of one in every 10 results.

**FIELD ACTIVITIES**

Duplicate samples are collected for direct gamma environmental radiation at 3 locations:

- 1) MPS-0117, an off-site, background monitoring site, with consistently low readings;
- 2) MPS-0107, an on-site location with consistently elevated readings; and 3) MPS-0127, an off-site location that is immediately up-wind of the City of Moab, and directly across the Colorado River and downwind of the Moab Site. Duplicate samples for radon-222 monitoring are collected only at the Maximally Exposed Individual (MEI) location. The MEI is located immediately east of the Moab Site property boundary, and represents the worst case exposure scenario to a member of the general public.

Duplicate samples are not collected for radio-particulate samples. This decision was made on a cost/benefit basis. Because the radio-particulate sample data collected to date indicate that all of the isotopes are several orders of magnitude below their respective derived concentration guides (DCGs), the costs associated with purchasing a duplicate sampler, providing additional electrical power, and incurring additional analytical expenses, were not warranted or justified.

## SUSPECTED ANOMALIES

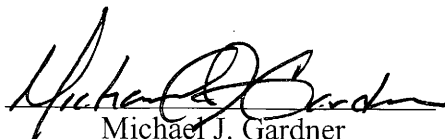
All analytical data were reviewed for anomalous or outlying data points. This review consisted of evaluating data against historical and minimum/maximum values, to determine if the reported data were within a reasonable, expected range. Because there are relatively few sample locations (i.e., data points), and the historical data set is relatively short, this review is conducted manually. An automated review of reported analytical data against historical and minimum / maximum values may be initiated at some point in the future once it is determined that the data set has become too large or cumbersome for an accurate, manual review.

Third quarter 2003 gamma monitoring data for locations MPS-0124, MPS-0125, MPS-0126, and MPS-0127 were observed to be significantly lower than values observed for these same locations during the 1<sup>st</sup> and 2<sup>nd</sup> quarters of 2003. The 1<sup>st</sup> and 2<sup>nd</sup> quarter data were also observed to be inconsistent (i.e., too high) with values that would be expected for off-site, near background or ambient conditions. Upon further review of the field data notes, it was discovered that the detectors (i.e., TLDs) used during the 1<sup>st</sup> and 2<sup>nd</sup> quarters at these locations were extra detectors that were "carried over" from the previous year. Although these TLDs were "unexposed" at the time they were initially deployed, they accumulated a certain amount of exposure even while in storage, and as a result, the final readings represent the cumulative exposure received during storage, plus the exposure received while deployed in the field, thus resulting in the abnormally high measurements. Therefore, the gamma data from the 1<sup>st</sup> and 2<sup>nd</sup> quarters of 2003 are considered anomalous and erroneous, are not appropriate for comparative purposes, and have been rejected. The 3<sup>rd</sup> quarter of 2003 gamma data for these locations are consistent with expected values, and are considered to be valid data points.

Based upon a review of the monitoring data collected during the 3<sup>rd</sup> quarter of 2003, no anomalous data points were identified, and the quality of the reported data (with respect to historical and expected minimum/maximum values) is acceptable.

## SUMMARY

All data collected during the 3<sup>rd</sup> quarter of 2003 met the applicable laboratory control criteria for their respective analyses, and all data were reviewed by sampling personnel and found to be within the acceptable limits of counting error associated with each matrix. Data reported in this Environmental Air Monitoring Report are considered validated and may be treated as final results.

  
Michael J. Gardner  
Environmental Scientist

03/23/04  
Date



# **ENVIRONMENTAL AIR MONITORING DATA**

**MOAB, UTAH**  
**MOAB SITE**  
**THIRD QUARTER 2003 SAMPLING**  
**ENVIRONMENTAL AIR MONITORING DATA SUMMARY**

This section contains data tables for all of the environmental air monitoring matrixes. Radon and direct environmental gamma radiation are combined on the same table. Each data table also displays monitoring data collected during the previous quarters for the calendar year.

Time versus concentration graphs have also been prepared for each matrix. Concentrations over time have been plotted only for selected locations for each matrix. The rationale used for selecting each location is summarized below.

**RADIO-PARTICULATES**

Radio-particulate monitoring data have been graphed for the following locations: 1) MPS-0102, one of two on-site radio-particulate monitoring locations. MPS-0102 is the radio-particulate sampling location closest to the MEI, and provides useful information regarding the MEI's exposure to airborne particulate matter. 2) MPS-0105 is the other on-site continuous radio-particulate sampler. This monitoring location is located on the bank of the Colorado River, is closer to the tailings pile itself, and is located in the predominantly down-wind vector of the Moab Site. This location provides particulate emissions information that is relative to the site boundary, and any possible emissions to the Colorado River corridor, and to the Matheson Wetlands Preserve. 3) MPS-0117 (near the Bar-M Chuck Wagon), is a background monitoring location located approximately 5 miles north of the Moab Site property, and represents ambient, or naturally-occurring conditions. 4) MPS-0120 (near the Portal RV Park), is located approximately one mile down-wind of the Moab Site, and represents exposure conditions and impacts that would be typical for the Moab community in general.

**RADON-222**

Radon-222 monitoring data have been graphed for the following locations: 1) MPS-MEI, this is considered to represent the worst-case exposure scenario to a member of the general public, and represents actual radon-222 exposure conditions at the MEI location. 2) MPS-0107 is located on the southern property boundary of the Moab Site. This location has historically recorded some of the highest radon exposure readings, and is useful in depicting exposure conditions that are found at off-site areas immediately south of the Moab Site. 3) MPS-0117 (near the Bar-M Chuck Wagon), is a background monitoring location located approximately 5 miles north of the Moab Site property, and represents ambient, or naturally-occurring conditions. 4) MPS-0120 (near the Portal RV Park), is located approximately one mile down-wind of the Moab Site, and represents exposure conditions and impacts that would be typical for the Moab community in general.

**DIRECT ENVIRONMENTAL GAMMA RADIATION**

Environmental gamma radiation data have been graphed for the following locations:

1) MPS-MEI, this is considered to represent the worst-case exposure scenario to a member of the general public, and represents actual gamma radiation exposure conditions at the MEI location.

2) MPS-0107 is located on the southern property boundary of the Moab Site. This location has historically recorded some of the highest gamma radiation exposure readings, and is useful in depicting exposure conditions that are found at off-site areas immediately south of the Moab Site. 3) MPS-0117 (near the Bar-M Chuck Wagon), is a background monitoring location located approximately 5 miles north of the Moab Site property, and represents ambient, or naturally-occurring conditions. 4) MPS-0120 (near the Portal RV Park), is located approximately one mile down-wind of the Moab Site, and represents exposure conditions and impacts that would be typical for the Moab community in general.

*Summary of Environmental Radon and Gamma Radiation Monitoring Data for the Moab Site for  
Calendar Year 2003*

Station Number	First Quarter 2003 (01/07/03 – 03/31/03)		Second Quarter 2003 (3/31/03 – 07/09/03)		Third Quarter 2003 (07/09/03 – 10/01/03)		Fourth Quarter 2003	
	Radon (pCi/L)	Gamma (mrem/91 d) (EAA) <sup>5</sup>	Radon (pCi/L)	Gamma (mrem/91 d) (EAA)	Radon (pCi/L)	Gamma (mrem/91 d) (EAA)	Radon (pCi/L)	Gamma (mrem/91 d) (EAA)
<b>On-Site Locations</b>								
MPS- 0101 <sup>1</sup>	3.2	77.3 (310)	1.8	62.9(252)	3.2	76.6(306)	NDA	NDA
MPS-0102 <sup>1</sup>	2.3	26.4(106)	2.1	21.4(86)	1.8	24.5(98)	NDA	NDA
MPS-0103 <sup>1</sup>	1.6	27.6(111)	1.2	21.5(86)	1.8	25.3(101)	NDA	NDA
MPS-0104 <sup>1</sup>	2.9	34.4(138)	2.3	25.2(101)	3.1	31.5(126)	NDA	NDA
MPS-0105 <sup>1</sup>	3.4	50.8(204)	2.8	43.0(173)	2.5	48.2(193)	NDA	NDA
MPS-0106 <sup>1</sup>	8.3	43.0(172)	7.1	34.5(138)	8.2	39.2 (157)	NDA	NDA
MPS-0107 <sup>1</sup>	6.8	55.0(221)	6.4	50.7(203)	5.5	52.6(210)	NDA	NDA
MPS-0107-D	NA	NA	NA	NA	NA	15.5(62)	NDA	NDA
MPS-0108 <sup>1</sup>	4.8	126.9(509)	6.2	120.6(484)	6.9	132.0(528)	NDA	NDA
MPS-0109 <sup>1</sup>	1.6	56.7(227)	2.1	52.9(212)	2.6	57.3(229)	NDA	NDA
MPS-0110 <sup>1</sup>	1.3	84.5(340)	2.9	77.7(312)	2.2	86.5(346)	NDA	NDA
MPS-0111 <sup>1</sup>	1.0	65.8(264)	1.9	55.0(221)	1.5	64.8(259)	NDA	NDA
MPS-0112 <sup>1</sup>	1.4	44.7(179)	2.5	34.7(139)	2.6	41.2(165)	NDA	NDA
MPS-0113 <sup>1</sup>	2.7	99.0(397)	2.5	84.7(340)	2.7	98.9(396)	NDA	NDA
MPS-0114 <sup>1</sup>	4.2	418.1(1,677)	5.3	354(1,420)	6.6	425.4(1,702)	NDA	NDA
MPS-0115 <sup>1</sup>	5.2	247.5(993)	6.1	195.8(785)	7.8	317.1(1,268)	NDA	NDA
MPS-0116 <sup>1</sup>	4.8	145.2(583)	5.8	121.6(488)	6.5	143.3(573)	NDA	NDA
<b>Off-Site Locations</b>								
MPS-0117 <sup>2,3</sup>	0.5	21.6(87)	0.8	19.9(80.0)	0.7	20.8(83)	NDA	NDA
MPS-0117-D	NA	NA	NA	NA	NA	17.6(70)	NDA	NDA
MPS-0118 <sup>2</sup>	0.7	23.4(94)	0.7	23.0(92)	1.2	23.1(92)	NDA	NDA
MPS-0119 <sup>2</sup>	1.0	19.8(79)	1.0	21.0(84)	1.0	24.3(97)	NDA	NDA
MPS-0120 <sup>2</sup>	0.6	16.1(65)	1.0	15.2(61)	1.1	17.0(68)	NDA	NDA
MPS-0121 <sup>2</sup>	0.4	21.0(84)	0.7	18.2(73)	0.4	19.7(79)	NDA	NDA
MPS-0122 <sup>2,3</sup>	0.6	18.6(75)	0.5	15.2(61)	0.5	17.2(69)	NDA	NDA
MPS-0123 <sup>2,3</sup>	0.4	19.0(77)	0.4	14.8(59)	0.5	18.4(74)	NDA	NDA
MPS-0124 <sup>2,3</sup>	1.9	NDA <sup>6</sup>	0.9	NDA <sup>6</sup>	1.6	20.6(82.4)	NDA	NDA
MPS-0125 <sup>2,3</sup>	2.0	NDA <sup>6</sup>	1.9	NDA <sup>6</sup>	1.8	23.8(95)	NDA	NDA
MPS-0126 <sup>2,3</sup>	1.7	NDA <sup>6</sup>	2.3	NDA <sup>6</sup>	1.7	23.1(92)	NDA	NDA
MPS-0127 <sup>2,3</sup>	1.4	NDA <sup>6</sup>	1.0	NDA <sup>6</sup>	1.5	20.4(82)	NDA	NDA
MPS-0127-D	NA	NDA <sup>6</sup>	NA	NDA <sup>6</sup>	NA	42.4(170)	NDA	NDA
MEI <sup>4</sup>	1.9 (1.7)dup	NA	1.2(1.8)	NA	1.8(1.9) dup	18.9(76)	NDA	NDA

<sup>1</sup> On-site monitoring location. Located within DOE property boundary.

<sup>2</sup> Off-site monitoring location.

<sup>3</sup> Designated background monitoring location. Background locations are located at sufficient distances away from the millsite to be free from any affects or influences from potential site contaminants.

<sup>4</sup> The maximally exposed individual (MEI) is the continually occupied residential property that is closest to the DOE property boundary.

<sup>5</sup> "EAA" is the estimated annual average and is calculated by dividing the actual reading by the number of days of the exposure period, then multiplying by 365. Values for annual averages are in units of mrem/yr.

NA = Not Applicable.

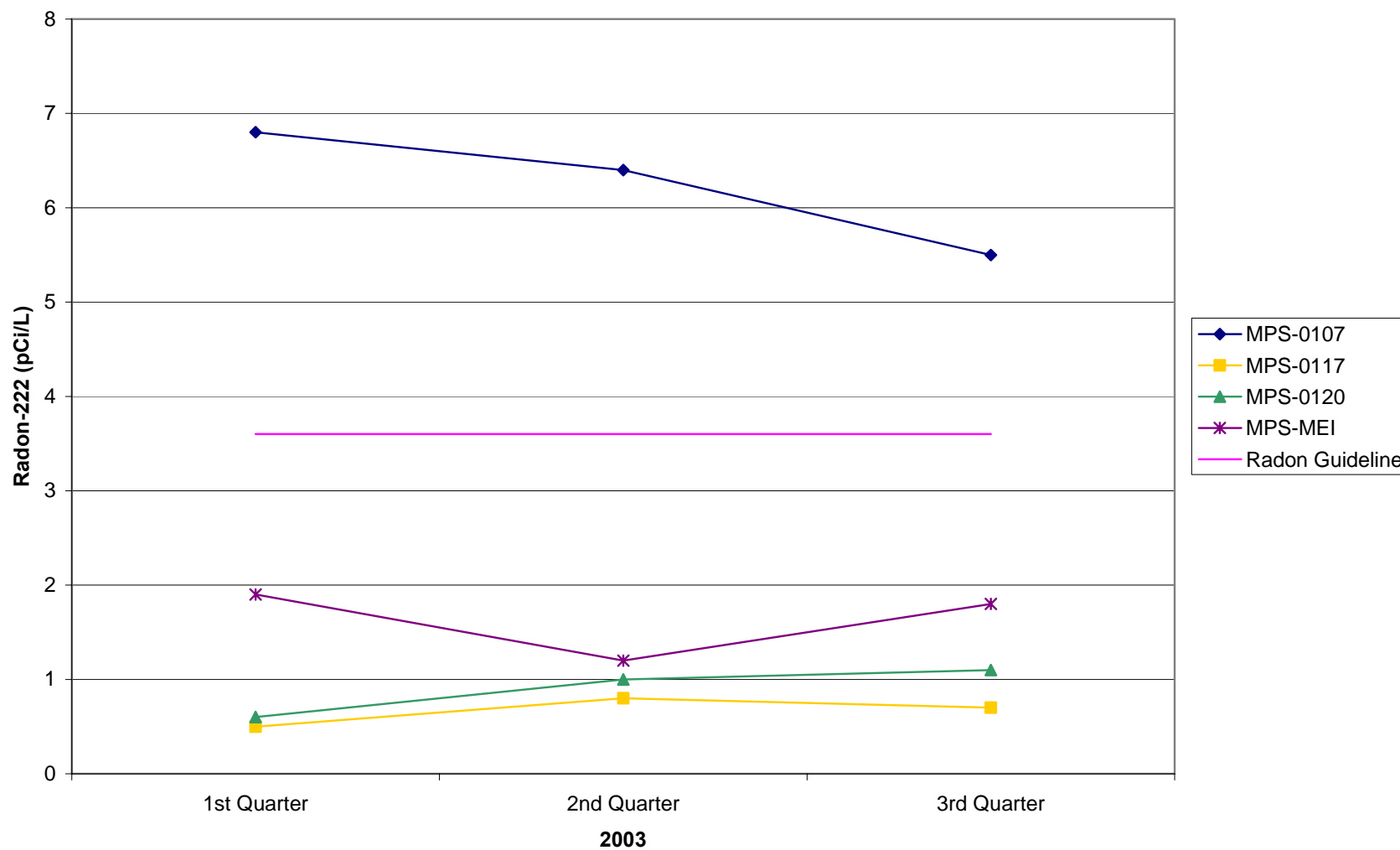
NDA = No Data Available.

<sup>6</sup> Data rejected for these locations for 1<sup>st</sup> and 2<sup>nd</sup> quarter of 2003 due to technical errors associated with the gamma radiation detectors (i.e., TLDs).

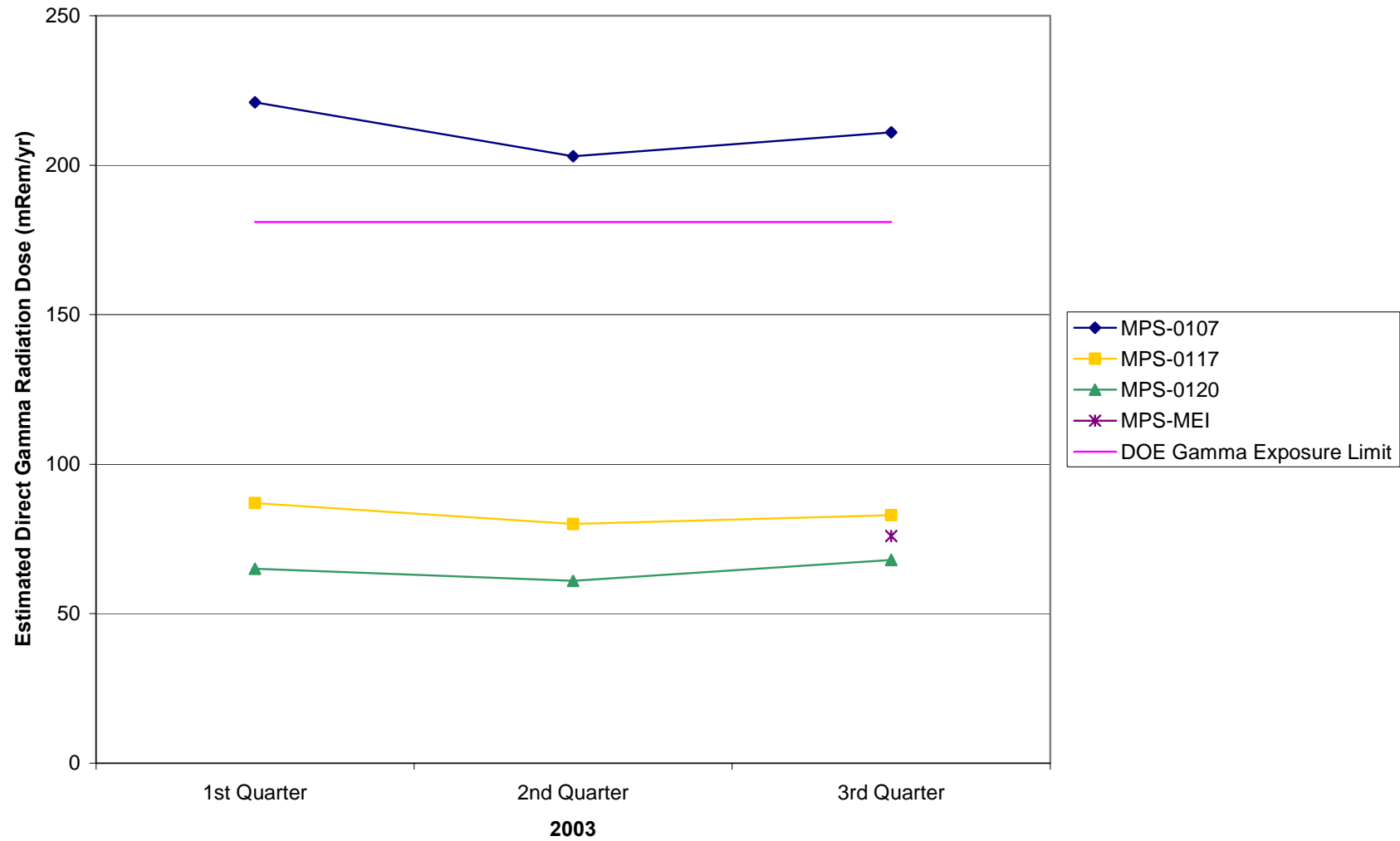
*Summary of Radioparticulate Air Monitoring Data for the Moab Site for Calendar Year 2003*

Station Number	Isotope	First Quarter 2003 ( $\mu\text{Ci/mL}$ )	Second Quarter 2003 ( $\mu\text{Ci/mL}$ )	Third Quarter 2003 ( $\mu\text{Ci/mL}$ )	Fourth Quarter 2003 ( $\mu\text{Ci/mL}$ )	Annual Average ( $\mu\text{Ci/mL}$ )
<b>On-Site Locations</b>						
<b>MPS-0102 (East Property Line)</b>	Uranium-Total	1.5E-16	2.0E-16	2.3E-16		
	Thorium-230	2.1E-16	2.5E-16	2.3E-16		
	Radium-226	3.2E-16	2.9E-16	3.0E-16		
	Polonium-210	4.2E-15	2.5E-15	2.6E-15		
<b>MPS-0105 (River Berm)</b>	Uranium-Total	3.2E-16	8.5E-16	1.1E-15		
	Thorium-230	3.3E-16	6.5E-16	8.5E-16		
	Radium-226	3.5E-16	4.2E-16	3.4E-16		
	Polonium-210	6.1E-15	3.8E-15	4.0E-15		
<b>Off-Site Locations</b>						
<b>MPS-0117 (Bar M Chuck Wagon)</b>	Uranium-Total	1.1E-16	1.3E-16	1.3E-16		
	Thorium-230	2.2E-16	2.0E-16	2.2E-16		
	Radium-226	3.1E-16	2.0E-16	3.1E-16		
	Polonium-210	4.0E-15	3.2E-15	3.0E-15		
<b>MPS-0118 (Arches National Park Entrance)</b>	Uranium-Total	1.0E-16	1.6E-16	2.0E-16		
	Thorium-230	2.5E-16	2.2E-16	2.6E-16		
	Radium-226	3.1E-16	2.0E-16	3.1E-16		
	Polonium-210	4.4E-15	3.2E-15	3.4E-15		
<b>MPS-0119 (Scott Matheson Wetlands Preserve)</b>	Uranium-Total	1.1E-16	1.5E-16	2.3E-16		
	Thorium-230	2.4E-16	2.4E-16	3.4E-16		
	Radium-226	3.2E-16	1.9E-16	3.1E-16		
	Polonium-210	4.8E-15	3.2E-15	3.2E-15		
<b>MPS-0120 (Portal RV Park)</b>	Uranium-Total	1.5E-16	2.0E-16	1.5E-16		
	Thorium-230	3.4E-16	4.2E-16	1.9E-16		
	Radium-226	3.1E-16	4.2E-16	3.1E-16		
	Polonium-210	4.3E-15	2.8E-15	3.4E-15		
<b>MPS-0121 (Moab Wastewater Treatment Plant)</b>	Uranium-Total	1.3E-16	1.3E-16	1.6E-16		
	Thorium-230	2.3E-16	1.7E-16	1.7E-16		
	Radium-226	3.4E-16	1.8E-16	2.7E-16		
	Polonium-210	4.5E-15	3.2E-15	2.9E-15		
<b>MPS-0122 (Grand County Recycling Center)</b>	Uranium-Total	1.2E-16	1.3E-16	1.4E-16		
	Thorium-230	3.2E-16	2.8E-16	2.5E-16		
	Radium-226	3.4E-16	2.0E-16	3.0E-16		
	Polonium-210	4.2E-15	3.4E-15	3.1E-15		
<b>MPS-0123 (Kane Creek Road)</b>	Uranium-Total	9.5E-17	1.3E-16	1.3E-16		
	Thorium-230	2.1E-16	2.6E-16	1.7E-16		
	Radium-226	3.3E-16	1.8E-16	3.1E-16		
	Polonium-210	4.3E-15	2.6E-15	3.2E-15		

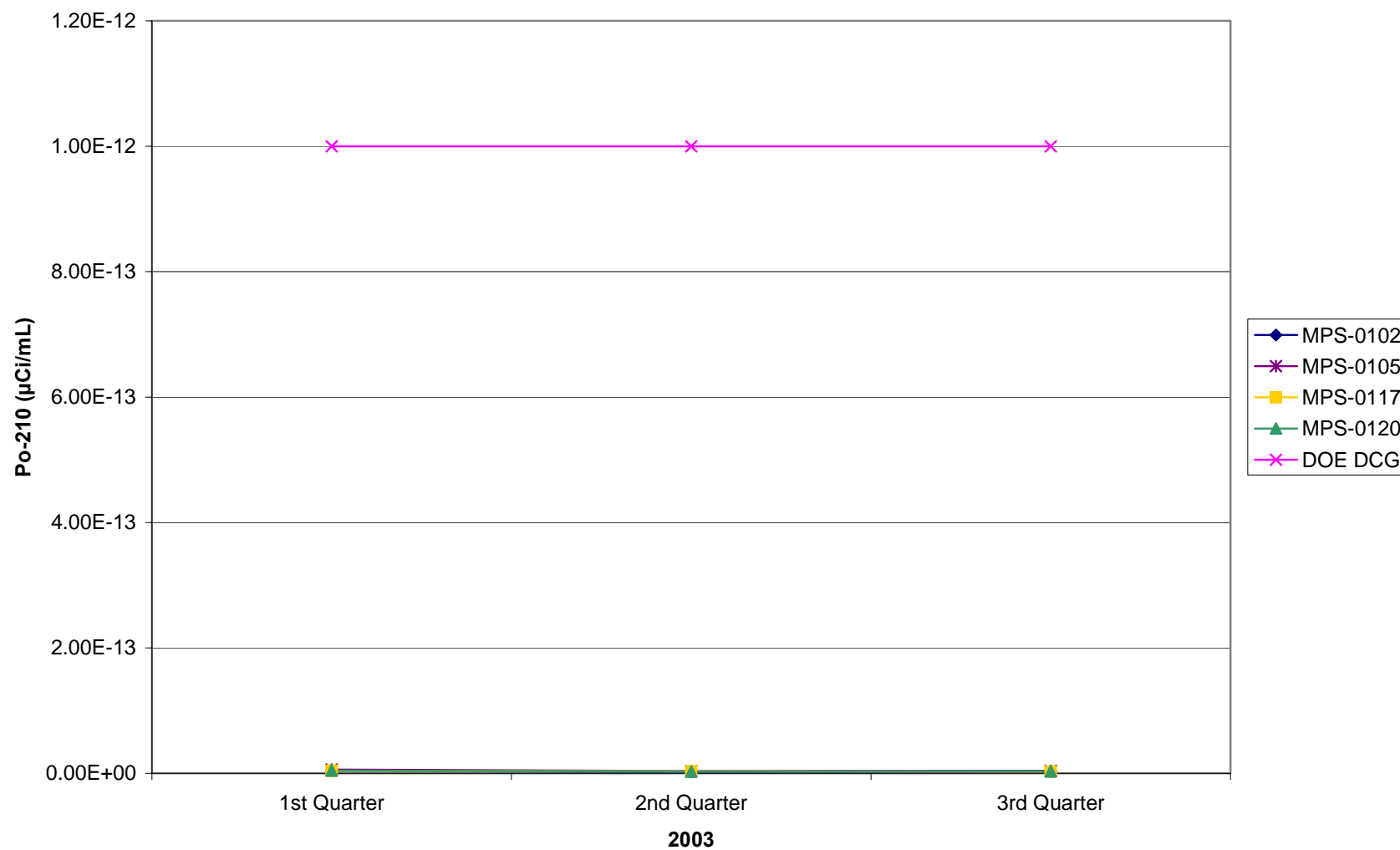
## Moab Atmospheric Radon-222 Concentration



### Moab Direct Gamma Radiation Dose

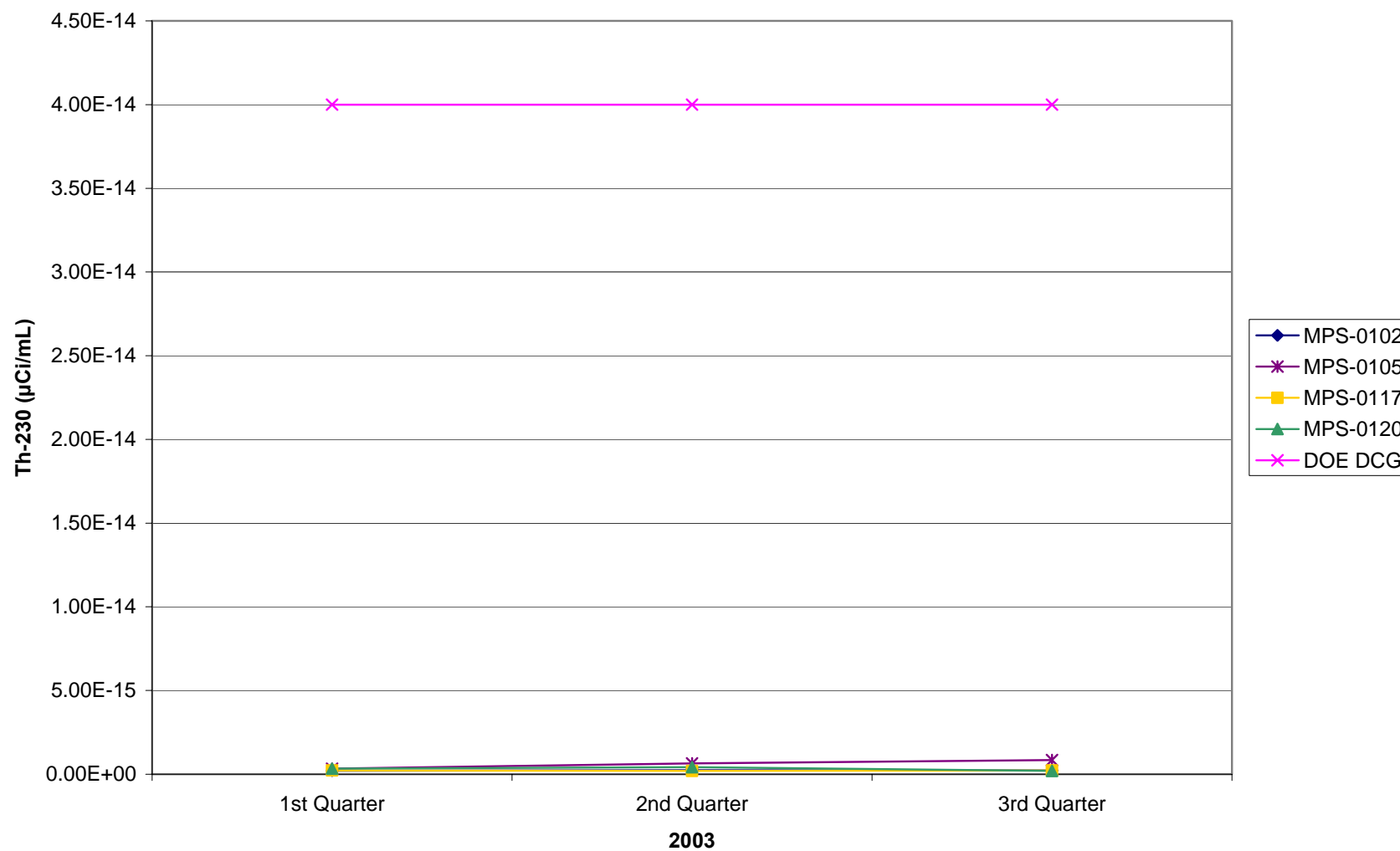


### Moab Radio-Particulate Concentration (Po-210)

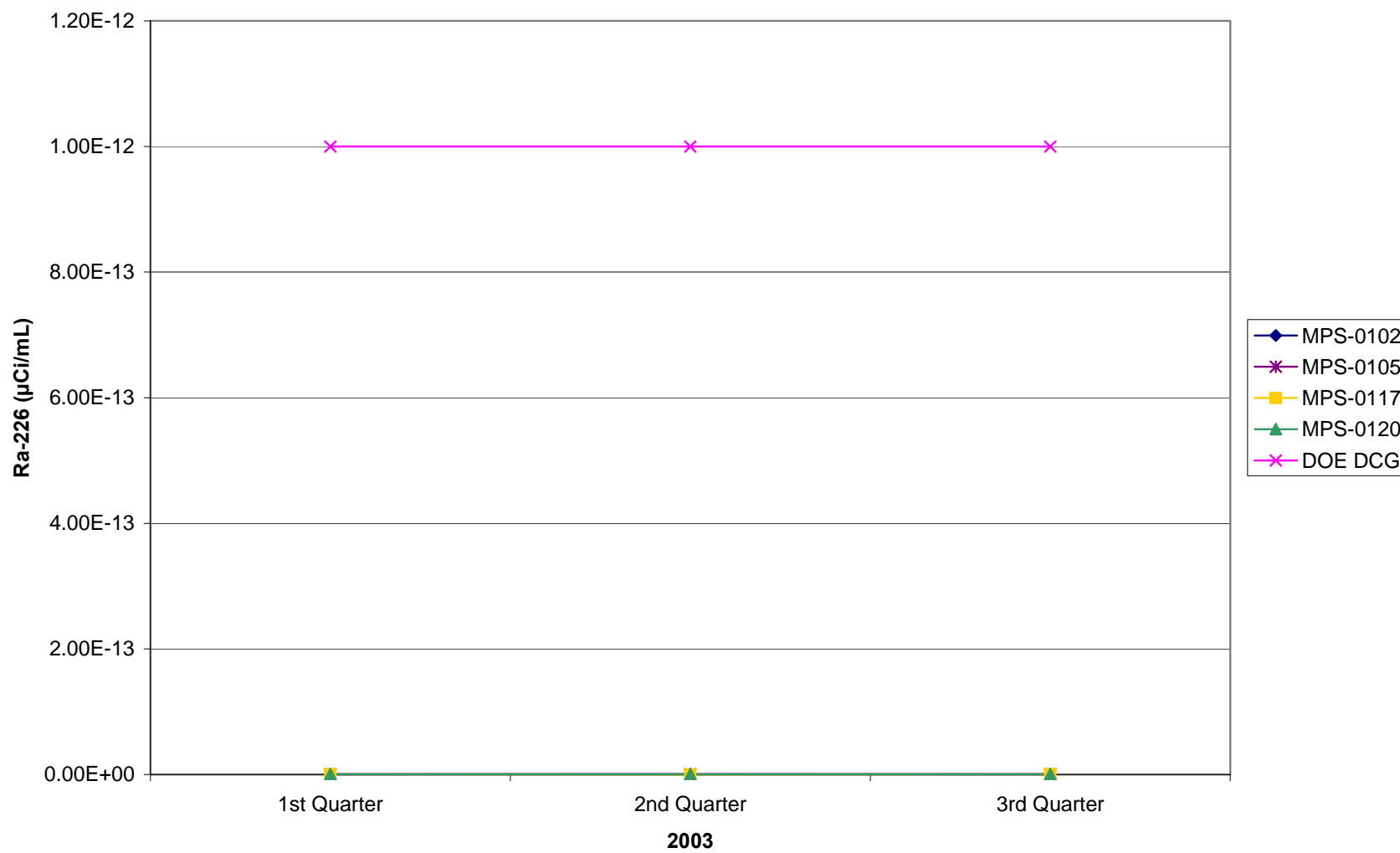




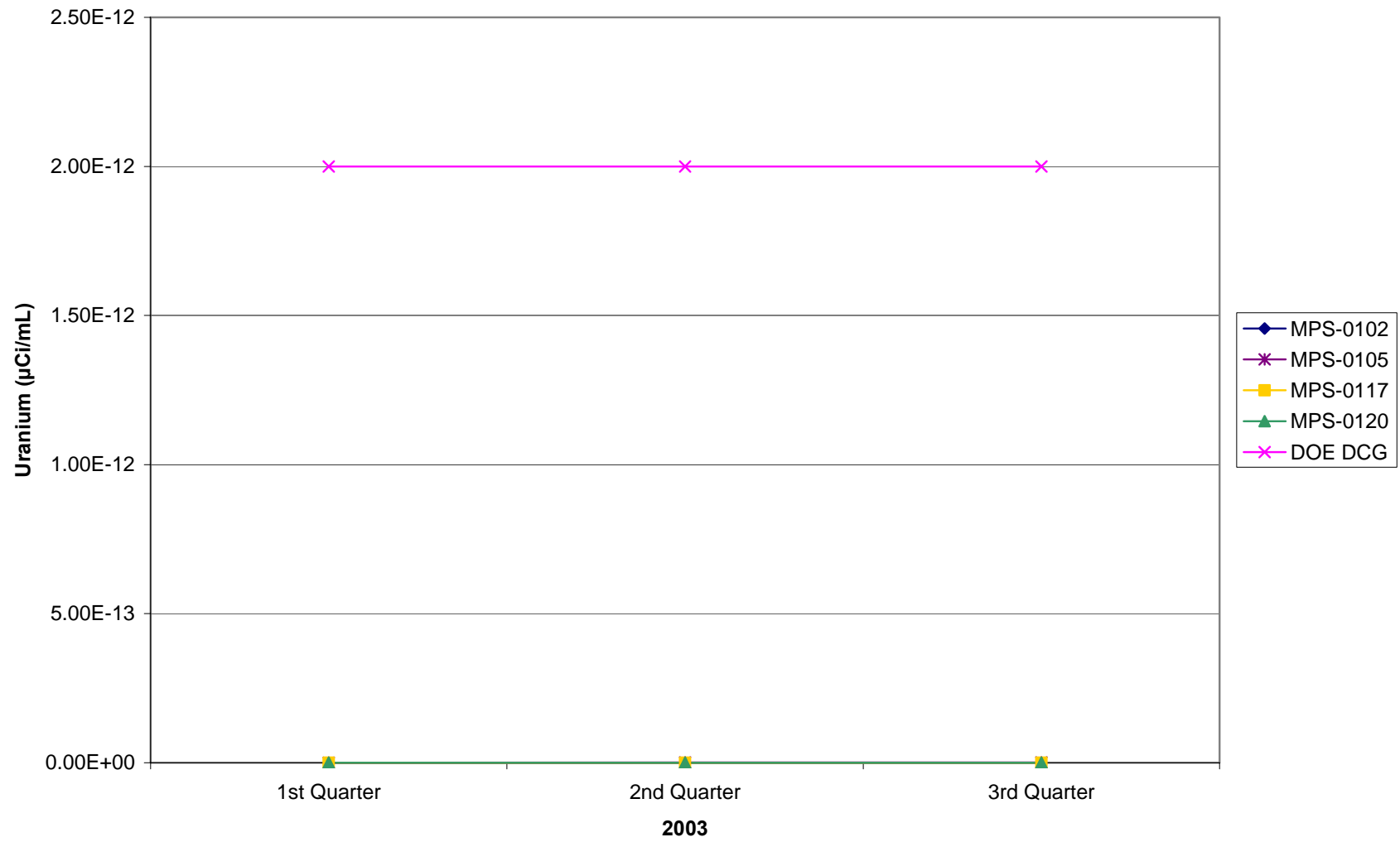
### Moab Radio-Particulate Concentration (Th-230)



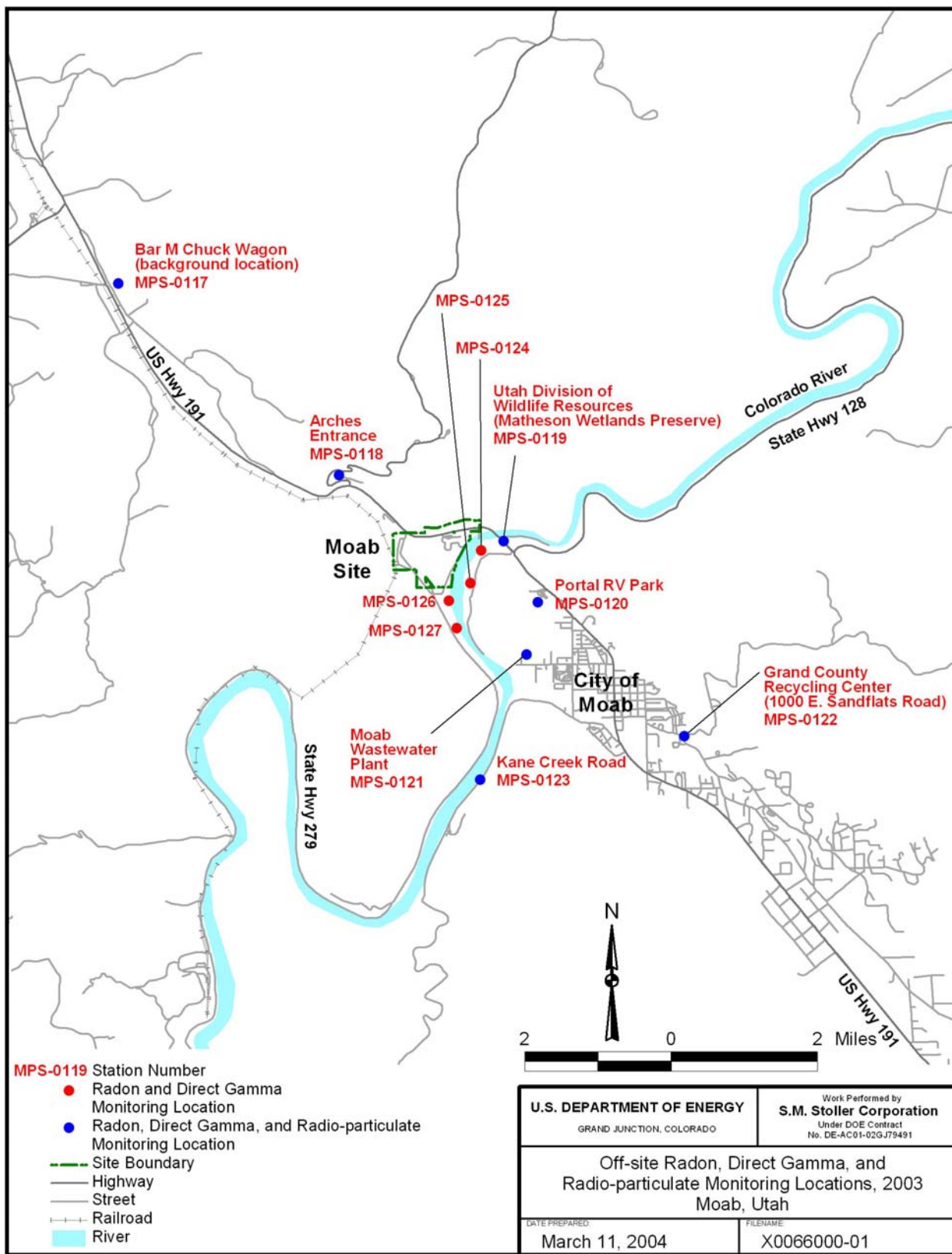
### Moab Radio-Particulate Concentration (Ra-226)



### Moab Radio-Particulate Concentration (Uranium)



## **SAMPLING LOCATION MAPS**



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